Significant Hypogammaglobulinemia in Very Low Birth Weight Infants

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Surviving preterm infants have a higher risk for infections in the post-neonatal period (1,2). In order to evaluate the immune status among preterm infants, we studied the gammaglobulin levels in preterm infants of gestational age less than 31 weeks.

30 infants were studied whose gestational ages ranged between 23 to 31 weeks who were all appropriate for gestational age. Immunoglobulin levels were obtained every 2 weeks at post-natal ages between 18 to 110 days. Infants were grouped according to their IgG levels. Group I consisted of 15 infants with IgG less than 100mg.%; Group II consisted of 8 infants with IgG 100-200mg.%; and Group III consisted of 7 infants with IgG 200-400mg.%.

TABLE I

	Group I (IgG<100)mg.% n = 15	Group II (IgG 100-200)mg.% n = 8	Group III (IgG 200-400)mg.% n = 7
Birth Weight	887.3 ± 190	1126.2 ± 88	1170 ± 142.9
Gestational Age	26.46 ± 2.2	29 ± 1	30 ± 0.8
IgG (mg.%)	50.82 ± 22.2	162.2 ± 28.49	269.28 ± 42
Post-Natal Age	73.46 ± 18.82	35.35 ± 5.84	24.71 ± 5.52

Between Group I and Group II statistically significant differences (P less than 0.01) were noted among Birth Weight, Gestational Age, IgG Levels and Post-Natal Age. Between Group II and III significant differences were noted among IgG levels and Post-Natal Age (P less than 0.01).

Further, these infants were grouped again according to their gestational age into 3 groups. Group I consisted of 6 infants with gestational ages between 23 to 25. Group II consisted of 9 infants with gestational ages of 26 to 28. Group III consisted of 15 infants with gestational ages of 29 to 31.

TABLE II

	Group I n=6 GA (23-25)	Group II n=9 GA (26-29)	Group III n=15 GA (29-31)
Birth Weight (Gms.)	701.66 ± 106	1000 ± 97.85	1153 ± 114.4
Gestational Age (weeks)	24 ± 0.6	27.7 ± 0.66	29.66 ± 0.81
IgG (mg.%)	36.93 ± 14.6	92.46 ± 58	192.77 ± 88.5
Post-Natal Age (days)	80.6 ± 24.6	57 ± 21.6	37.33 ± 18

Statistically significant differences were noted (P less than 0.05) between birth weights, gestational ages and IgG levels in Groups I and II. Between Groups II and III statistically significant differences were seen in birth weights, gestational ages, IgG levels and post-natal age.

We further studied the cord blood levels and the percentage of the drop of the gammaglobulin levels among 5 infants. The mean birth weight of this group is 1018 ± 214gms. at a mean gestational age of 28.2 ± 2.6 weeks. They had a mean percentage drop in the gammaglobulin levels from a cord blood IgG level of 72.99 ± 5.3% by a mean post-natal age of 44.7 ± 12 days.

Our results indicate that infants born with extreme prematurity tend to have significant and severe hypogammaglobulinemia.

The IgG levels in the fetus remain low until about the 17th week of gestation (3). Afterwards, the levels increase proportionately to the gestational age. At 40 weeks of gestation, the IgG levels are about 5 to 10% higher than the maternal levels. This is due to an active and passive component in the transfer of IgG to the fetus from the Mother. Previous studies have demonstrated a linear relationship between IgG levels and the gestational ages (4,5).

Our results indicate that infants with birth weights of less than 1000gms. are susceptible to extremely low levels of gammaglobulin by approximately 2½ months of post-natal age. It had been reported that the post-neonatal mortality is high for infants discharged from an intensive care nursery and infections accounted for approximately 12% of the mortality among this group (6). We have documented that extremely low birth weight infants have very low levels of gammaglobulins by the time they are between 2 and 3 months of age. Whether these infants will benefit from gammaglobulin administration is not known at present. We recommend monitoring gammaglobulin levels on all infants of less than 31 weeks of gestational age prior to discharging from the intensive care nursery and for further serial followup.

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